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SAGE TASK-EQUIPMENT ANALYSIS

OVERLAP TECHNICIAN

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ABSTRACT

This report describes the operation of the Overlap Technician in the Boston Air Defense Sector (BOADS) of the SAGE System.

The analysis is concerned with delineating the interface between man and machine or, in other terms, describing the relationship between the equipment to be operated and the task of the operators. The present report is one of a series which, ultimately, will cover almost all of the positions in a SAGE Direction Center, and some of the positions in a SAGE Combat Center.

TABLE OF CONTENTS

GUIDE TO USE OF THE TASK-EQUIPMENT ANALYSIS

I. INTRODUCTION

This task-equipment analysis (TEA), describes the performance of an operator or of an operator-technician team in the Boston Air Defense Sector (BOADS) of the SAGE System.

As the term TEA implies, the analysis is concerned with delineating the interface between man and machine or, in other terms, describing the relationship between the equipment which is to be operated and the task of the operator. The present record is one of a series which, ultimately, will cover almost all of the positions in a SAGE Direction Center, and some of the positions in a SAGE Combat Center.

The general philosophy of the TEA is the systematic description of responses required in any task and the actions necessary to effect these responses. Emphasis is placed on the stimulus condition which signals the operator for action appropriate to the response required. Provision is made also for specially noting communications.

The method for generating the TEA was as follows. Observers read and thoroughly familiarized themselves with existing positional handbooks and training materials. Next, they interviewed job incumbents, stressing the need for listing all indicators. The rough draft so obtained was compared with observation of a number of other operators working under load conditions. Inconsistencies and omissions were brought to light in interviews with additional operators. Drafts were revised and the cycle was repeated to the point where observation of any operator revealed substantial agreement with the existing TEA. The entire process required from 15 to 100 hours of interviewing and observation depending on the position being described.

It should be noted that, unlike conventional job analyses, the TEA makes no attempt to describe environmental conditions, nor list physical and psychological traits, or skill level, presumably necessary for job incumbents. Instead, TEA's orientation is toward description of elements of job performance -- the actions required to effect required responses. This orientation does not create an incompatibility with traditional approaches. Data yielded by the latter can always be deduced from TEA. However, TEA technique generates information about job content and interaction which the traditional approach cannot do.

The TEA is closer in philosophy to the positional handbooks used in the SAGE system. The following differences are noted.

(1) The handbooks do not systematically bring together the elements--indicator, response required, action, by whom performed, feedback, and recipient. This is a basic feature of TEA. Most of these appear at some place in the positional handbook, but the approach is through separation of procedures and use of facilities rather than a coordination of these aspects. (2) Feedback, or indication of adequacy of an action is largely neglected in handbooks, although included for every action in TEA. (3) Occasions where alternative actions may be taken do not appear in the sequence of procedures, although included in TEA. (4) There is no clear specification of occasions in which the operator must make decisions in the absence of specific indicators; these are included in TEA. (5) The handbooks are prescriptive, i.e., they tell what should be done. The TEA is descriptive, i.e., it tells what is done.

II. ASSUMPTIONS AND CONDITIONS OF THE TEA

In order to perform the analysis, certain limiting assumptions are necessary. Their propriety is justified in the explanatory material following each assumption.

General

1. The appropriate position unit for a TEA in SAGE is the operator-technician team. There is so much communicative interplay between the two positions which constitute the team that an approach to either position separately would be misleading.

2. The operation described is as it would be performed in an active air situation. Thus, the TEA does not encompass training situations with simulated aircraft.

3. Normal manning applies.

4. All equipment may be assumed to be functioning normally unless otherwise noted in the TEA.

5. Only the method generally agreed upon by operators will be described routinely. Alternative techniques will be noted when appropriate.

6. Where specific actions may vary because of differences in sector SOP and/or program model, the sector will be BOADS and Model 5 will be understood.

Specific

Assumptions and conditions specific to this positional analysis will be found on page 7.

III. DESCRIPTION OF TEA FORMAT

The Task Group

The basic unit for the TEA is the TASK GROUP. A TASK GROUP is the complete sequence of responses required by an operator, performed as a result of an external stimulus, herein called an INDICATOR. The INDICATOR may be an audible or visible alarm, an attention device displayed on the situational display (SID)*or the digital display (DID). It may be simply a telephone or radio transmission or be as complex as a particular configuration on the SID not augmented by other means. The INDICATOR is always initiated by a SOURCE external to the operator-technician team. Results of actions which represent serial stimuli to further actions (e. g. , alarm ceases when RESET button is depressed) are called FEEDBACK to distinguish them from INDICATORS. In any event, a TASK GROUP always starts with an INDICATOR and continues to an end. It has a title given in capital letters at the top of each page and is identified with a Roman numeral, e. g. , I. RELIEVE PREVIOUS SHIFT.

Meaning of Columns

The columns have meaning as follows:

1. ITEM — a number used to designate an entry.

2. RESPONSE REQUIRED — name of the response required as the next step in a task sequence. It is oriented in terms of product or result rather than method.

3. ACTION — the specific act or acts which must be taken to implement the RESPONSE REQUIRED.

4. WHO — the person (operator or technician) taking the action. When either can take it, both appear in order of observed frequency.

5. FEEDBACK — a state resulting from an ACTION which indicates the adequacy with which the RESPONSE REQUIRED has been performed; it may serve as a stimulus for serial ACTIONS.

6. RECIPIENT — the person or unit to whom the operator or technician (designated in the WHO column) transmits information.

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* A glossary of terms and abbreviations used in this TEA appears in the last section of the report.

7. REMARKS — minor elaboration of item content or cross reference.

Levels of Required Responses

The smallest unit of response is that unit requiring a single action; e. g., "Acknowledge Alarm." Within a TASK GROUP sequence, however, it is sometimes convenient to subsume a related sequence of acts under a topical title. Thus, those acts relevant to obtaining a track DID are subsumed under the response entitled "Obtain Track DID."

Interpolated Indicator Actions

A basic principle of the TEA technique is that a TASK GROUP is initiated by an INDICATOR; conversely, an INDICATOR initiates a TASK GROUP. However, in the course of a long TASK GROUP, certain required responses may be initiated by interpolated INDICATORS after which the TASK GROUP continues. This apparent inconsistency with the basic principle is resolved as follows: At the point in the main sequence of the TASK GROUP at which the interpolated INDICATOR occurs, the name of the RESPONSE REQUIRED is entered or it is described in a phrase written across the page. The ACTION necessary is not listed here, but under a separate TASK GROUP headed by the appropriate INDICATOR referenced in the REMARKS column.

Alternatives and Extended Remarks

At a given point in a TASK GROUP, it is sometimes necessary to describe alternatives or special circumstances which alter the prescribed response. The procedure used is that of extending the remark across the page without regard to column headings. The REMARKS column itself is used for brief qualifications of content already entered in the other columns.

Treatment of Decisions

Occasionally, at a given point in a TASK GROUP sequence, a response is required which does not naturally follow the previous INDICATOR. The title of such a response will appear in the RESPONSE REQUIRED column, preceded by the word "Decides." The corresponding ACTION implements the decision. If the decision involves a lengthy series of ACTIONS, they may appear on a separate page; alternatively they may be integrated into the TASK GROUP sequence.

Shift-Change and Console Set-Up

The TEA for any position will always include a description of procedures involved in shift-changeover, setting up consoles, etc.

Use of Light Gun and Activate Button

Many TASK GROUPS involve actions which can be performed in alternative ways; e. g., in some instances the computer can be activated by operating the Light Gun or by depressing the ACTIVATE button. When this is true, the TEA will cite that method most frequently used at BOADS.

Use of Typographical Indications

1. Capital letters are reserved for titles of TASKS GROUPS and for button and switch labels; e. g., CONDUCT AN INTERCEPT, ACTIVATE button.

2. In the RESPONSE REQUIRED column, responses requiring a single action are not underlined. Responses requiring more than one action, however, are underlined, e. g., "Obtain Track DID."

3. In the ACTION column, button or switch action is indicated by the corresponding abbreviation (B) or (S) followed by the capitalized name of the button or switch; e. g., (B) ACTIVATE. Light Gun action is indicated by the symbol (LG). Where lower case appears in the ACTION column, this indicates the title of a group of buttons, rather than a specific button; e. g., "Target Track Numbers" means that several button numbers are depressed.

4. In the ACTION and FEEDBACK columns, telephonic, radio, or oral communication is abbreviated as (T), (R), or (O), followed by a description of the communication as appropriate; e. g., "(T) Acknowledge" in the FEEDBACK column means that the adequacy of the operator's response could be checked by him through telephone to the RECIPIENT of his ACTION. The letters (SP) and (BP) designate "switch position" and "button position" respectively and are used in the FEEDBACK column.

IV. USES FOR THE TEA

The TEA was developed primarily as a groundwork for test construction and human factors field studies. It may be useful to set forth systematically all of its uses.

Familiarization

The detail of the TEA is such that the recorder must inevitably become quite familiar with the position he is describing. The present TEA will not, of course, afford such effective use to a reading audience. However, it does provide a sequential picture of job tasks which may be used as orientation material at the detailed level by anyone seeking familiarity with SAGE.

Basis for Test-Item Construction

TEA material is a source for detail used in writing paper and pencil test items. It is also a guide for insuring coverage of the subject matter for test construction purposes.

Training

TEA material can provide a check on the coverage included in current formal training curricula; it could also act as a guide in the construction of OJT programs.

Model Building

TEA provides the detail necessary for the construction of information-flow or decision-type system models.

Basis for Situational Test Construction

TEA provides the detail necessary for the construction of situational on-the-job tests. These supplement paper and pencil tests by measuring what a man can and will do as well as what he knows.

Indication of Problem Areas

TEA provides indications of problem areas thereby affording leads for program and equipment design changes.

Basis for Estimation of Aptitude Level

The systematic description of all actions affords possibility of estimating aptitude level required for various positions in terms of cognitive and perceptual factors.

TASK-EQUIPMENT ANALYSIS
OVERLAP TECHNICIAN

The prime duty of the Overlap Technician (OT) is insuring that tracks entering and leaving the sector are transferred properly. Even though the transfer of these tracks will take place automatically, it is vital that assistance be given the computer when the track load in one area becomes heavy. In addition to seeing to the proper transfer of tracks the OT acts as a track monitor whose area of responsibility is the overlap zone (15 miles either side of the sector boundary.)

This TEA describes in detail all OT duties during normal mode of operation and also describes any change in these duties during the expanded modes (MODE II A and B).

It will be observed that neither the ATTENTION TO nor the INITIATE MANUALLY actions are discussed in the TEA. It was stated by all of the OT's interviewed that neither of these actions are used.

To avoid repitition in the description of actions required in requesting DID's, or in passing other instructions to the computer, the step of operating the RELEASE button is omitted, although this step is prescribed as standard procedure precedent to any request.

During the TEA development, it was possible to detect problem areas; i.e., instances where it might be difficult for an operator to determine the next response or where there was insufficient indication of response adequacy. The former instance could be attributed usually to absence of an effective INDICATOR—the latter to insufficient FEEDBACK. Whenever this is the case, the item number has been circled as a cue for further work.

I. RELIEVE PREVIOUS SHIFT

INDICATOR Shift Change SOURCE SOP

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
1.	Receives crew briefing from the SD, summarizing current weather, equipment status, and the current air picture.					
2.	Receives Surveillance section briefing from ASO, outlining salient information.					
3.	Previous OT informs new OT of any automatic Cross-Tell trouble, any other unusual conditions and points out all HUK or other priority type tracks in the system.					
4.	Activate Communication Equipment	Plug in headset	OT	Operative telephone		
5.	Turn up Console Lamps	(S) Panel lamps	OT	(SP), lamps illuminate		Actions 5 through 14 represent typical settings. These settings may be changed during subsequent operations.
6.		(S) Desk lamps	OT	(SP), lamps illuminate		
7.	Check Unit Status	(S) Insure that UNIT STATUS Switch is set to ACT.	OT	(SP), SID		
8.	Select Feature Switches	(S) BRIGHT-left (left bank)	OT	(SP), SID		
9.		(S) E, D, C, B-left (left bank)	OT	(SP), SID		
10.	Select Category Switches	(S) AIR BASES, SECTOR BOUNDARIES-left	OT	(SP), SID		
11.		(S) ALL TRACKS-left	OT	(SP), SID		
12.		(S) TROUBLE TRACKS-left	OT	(SP), SID		
13.		(S) CROSS-TOLD TROUBLE TRACKS-left	OT	(SP), SID		
14.		(S) MANUAL INPUT TRACKS-left	OT	(SP), SID		
15.	Select Display Expansion	(S) EXPANSION Switch to NORM	OT	(SP), SID		May be changed as required during subsequent operations.
16.	Check Light Gun	(LG) on some convenient radar data	OT	LG lamp illuminates, alarms operate		This also checks audible and visual alarm

I. RELIEVE PREVIOUS SHIFT (Cont'd)

INDICATOR Shift Change SOURCE SOP

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
17.	Silence Alarm	(B) RESET	OT	Alarms cease		
18.	There are some variations to the above setup. Some OT's feel, for instance, that the Radar Data and Mark X category switches should be used so that when the need for reinitiation occurs the proper action will be apparent.					

II. ACCEPT TRACK

INDICATOR SID - Track Entering Sector

SOURCE Computer

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
1.	Tracks will be accepted automatically when they reach the 15 mile near overlap zone. The OT merely accelerates this process.					
2.	Accept Track	(B) ACCEPT	OT	(BP)		
3.		(LG) on point feature of track	OT	LG lamp illuminates, symbology changes		
4.	If the SID is crowded or cluttered it will be more convenient to accomplish the above action by use of the ACTIVATE button.					

III. HANDOVER TRACKS

INDICATOR (T) Request Handover of Some Tracks SOURCE _____ TO _____

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
1.	Alternatively, if the Cross-Tell program between the two sectors is not functioning properly, the INDICATOR may be a request from the Adjacent OT.					
2.	Acknowledge Handover Request	(T) TO receiving specific instructions	OT	(T) Acknowledge		
3.	Request Permission	(T) Adjacent OT, requesting permission to handover tracks	OT	(T) Acknowledge	Adj. OT	
4.	Handover Track	(B) Track Number	OT	(BP)		
5.		(B) HANDOVER	OT	(BP)		
6.		(B) Adjacent Sector	OT	(BP)		
7.		(B) ACTIVATE	OT	Symbology change		This action will be repeated until TO calls to say that he is satisfied with results

IV. ATTEMPT TO ASSOCIATE DATA WITH SYMBOLOGY

INDICATOR SID-Data Without Symbology Entering Sector

SOURCE Computer

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
1.	Request Information	(T) Adjacent OT determining whether he has proper symbology	OT	(T) Acknowledge	Adj. OT	
2.	The Adjacent OT will reinitiate if he finds proper symbology or will request his IS to initiate on the data if he finds no proper symbology. If, however, the adjacent sector has symbology already associated with the data					
3.	Report Cross-Tell Trouble	(T) SMC	OT	(T) Acknowledge	SMC	
4.	Report Cross-Tell Trouble	(T) TO	OT	(T) Acknowledge	TO	
5.	If adjacent sector has no data					
6.	Request Initiation	(T) IS indicating specific data trail	OT	(T) Acknowledge	IS	

V. ATTEMPT TO ASSOCIATE SYMBOLOGY WITH DATA

INDICATOR SID-Symbology Without Data Entering Sector SOURCE Computer

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
1.	Request Information	(T) Adjacent OT determining whether he has proper data.	OT	(T) Acknowledge	Adj. OT	
2.	If the adjacent sector has no data					
3.	Request Drop Action	(T) Adjacent OT, requesting that specific symbology be dropped.	OT	(T) Acknowledge	Adj. OT	
4.	If the adjacent sector has data with this symbology OT will delay as long as possible before accepting the track (see TASK GROUP II) in hopes that his own radar will pick it up. When the track is accepted automatically he will Dead Reckon it (see TASK GROUP VII) so that it will not drop out of the system. If data still does not appear after the Dead Reckon action					
5.	Request Drop Action	(T) appropriate tracking position, requesting drop	OT	(T) Acknowledge	TO if it is a HUK track or TS if it is a friendly track	

VI. ATTEMPT TO REINITIATE

INDICATOR SID-Symbology Without Data Leaving Sector — SOURCE Computer

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
1.	Obtain Track History	(B) TRACK HISTORY	OT	(BP)		
2.		(LG) on point feature of selected track	OT	LG lamp illuminates, Track History appears		
3.	If possible the OT will					
4.	Reinitiate	(B) REINITIATE	OT	(BP)		
5.		(B) Track Number	OT	(BP)		
6.		(LG) on present radar data	OT	LG lamp illuminates, symbology moves to selected position		
7.	If proper symbology cannot be found the OT will:					
8.	Request Information	(T) Adjacent OT requesting location of proper data	OT	(T) Acknowledge	Adj. OT	
9.	The OT will let the Adjacent OT initiate if they have proper data. If they can not find proper data he will then,					
10.	Put Track in Lost Category	(B) LOST	OT	(BP)		
11.		(LG) point feature of track	OT	LG lamp illuminates, symbology change		This action prevents a track from being cross-told or stops it from being cross-told if it is already in that state. It will drop out of the system in approximately five minutes.

VII. DEAD RECKON

INDICATOR SID-Track Entering Clutter

SOURCE Computer

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
1.	Dead Reckon	(B) Track Number	OT	(BP)		
2.		(B) DEAD RECKON	OT	(BP)		
3.		(B) Speed	OT	(BP)		
4.		(B) HEADING	OT	(BP)		
5.		(B) ACTIVATE	OT	Symbology change		This action will be repeated every minute until track is through the clutter. Re-initiation (see TASK GROUP VI) will then usually be necessary

VIII. EXCHANGE

INDICATOR SID-Symbology of One Track Exchanges With Another

SOURCE Computer

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
1.	Obtain Track History					See TASK GROUP VI
2.	Exchange	(B) EXCHANGE	OT	(BP)		
3.		(B) Track Number of one track	OT	(BP)		
4.		(LG) on point feature of the other track	OT	LG lamp illuminates, symbologies exchange		
5.	Reinitiate					See TASK GROUP VI

IX. TRANSMIT MI TRACK TO MANUAL SITE

INDICATOR SID-Unknown Appears (Manual Input) SOURCE Computer

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
1.	Obtain Track DID	(B) Track Number	OT	(BP)		
2.		(B) TRACK DID	OT	(BP)		
3.		(B) ACTIVATE	OT	DID appears		
4.	Inform Manual Direction Center	(T) Manual Direction Center, giving MI track data	OT	(T) Acknowledge	Manual DC	Track data includes GEOREF, and heading, of unknown. The Manual Direction Center will attempt to pick up this track on its radar thereby acting as a backup to SAGE.
5.	The OT will repeat the above actions every five minutes until the Unknown has been intercepted or identified Friendly or until the Manual Direction Center picks up the track and requests OT to stop transmission.					

X. TRANSMIT INFORMATION TO MANUAL SITE

INDICATOR SID-Unknown Appears (Live Data) SOURCE Computer

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
1.	Obtain Track DID					See TASK GROUP IX
2.	Inform of Unknown	(T) Manual Direction Center, informing of SAGE classification	OT	(T) Acknowledge	Manual DC	
3.	Transmit Information	(B) Manual Site	OT	(BP)		
4.		(B) Track Number	OT	(BP)		
5.		(B) START X TELL	OT	(BP)		
6.		(B) ACTIVATE	OT	SID change		Action results in a teletype message being sent to Manual Direction Center.
(7.)	Request Information	(T) Manual Direction Center, checking receipt	OT	(T) Acknowledge	Manual DC	This telephone call is made only to insure that the teletype message is being received.
8.	When track is intercepted or identified Friendly					
9.	Inform of Stop Cross-Tell	(T) Manual Direction Center, giving disposition of Unknown	OT	(T) Acknowledge	Manual DC	
10.	Alternatively, if Manual Direction Center picks up track on its radar, it will request Stop Cross-Tell action.					
11.	Stop Cross-Tell	(B) Manual Site	OT	(BP)		
12.		(B) Track Number	OT	(BP)		
13.		(B) STOP X TELL	OT	(BP)		
14.		(B) ACTIVATE	OT	SID change		

XI. CROSS-TELL TRACKS DURING MODE II OPERATION

INDICATOR SID-Track Outgoing Across Expanded Boundary SOURCE Computer

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
1.	During Mode II there is no automatic Cross-Tell between the expanded area and the adjacent sector; therefore the Cross-Telling of tracks must be done by voice. Only HUK type and friendly tracks that have penetrated ADIZ need be passed. Passing and accepting tracks are the only duties of the OT that undergo change during Mode II operation. In Mode II B the BOADS OT has the responsibility of voicetelling to both Syracuse and Washington, while in Mode II A he need only voicetell tracks to Syracuse.					
2.	Inform Adjacent OT	(T) Adjacent OT, giving location data	OT	(T) Acknowledge	Adj. OT	
3.	If Adjacent OT cannot find proper data this OT will					
4.	Obtain Track DID					See TASK GROUP IX
5.	Inform Adjacent OT	(T) Adjacent OT, giving additional data from DID	OT	(T) Acknowledge	Adj. OT	
6.	OT repeats steps 4 and 5 every two minutes until he receives a telephone call saying that proper data has been picked up.					

XII. ACCEPT TRACKS DURING MODE II OPERATION

INDICATOR (T) Track Is Entering Your Sector SOURCE Adjacent OT

ITEM	RESPONSE REQUIRED	ACTION	WHO	FEEDBACK	RECIP.	REMARKS
1.	Acknowledge (T)	(T) Obtaining location of track	OT	(T) Data		
2.	Check SID	Scan SID for track	OT	SID		
3.	If the OT finds proper data					
4.	Request Initiation	(T) IS requesting initiation and giving initiation data	OT	(T) Acknowledge	IS	Initiation data includes the track number and location.
5.	If the OT does not find proper data he will request Adjacent OT to pass the track to this sector's MDS					
(6.)	Check SID	Scan SID for track	OT			
7.	When OT finds proper data					
8.	Request Initiation					See Item 4 above.
9.	Request Drop MI Track	(T) TO, requesting MI be dropped	OT	(T) Acknowledge	TO	

GLOSSARY OF ABBREVIATIONS AND DEFINITIONS

ABBREVIATIONS

AADCP	Army Air Defense Command Post
A/C	Aircraft
ADAD	Air Defense Artillery Director
ADIZ	Air Defense Identification Zone
AEW	Airborne Early Warning
AFIO	Agreement for Interceptor Operation
Alter WAD	Alternate Weapons Assignment Display
AMD	Air Movement Data
AMIS	Air Movements Information Section
ARTCC	Air Route Traffic Control Center
ASO	Air Surveillance Officer
AST	Air Surveillance Technician
(B)	Button (followed by button name)
BOADS	Boston Air Defense Sector
BP	Button Position
CAP	Combat Air Patrol
CC	Combat Center
CCNT	Chief Controller
CP	Command Post
DID	Digital Information Display
DR	Dead Reckon

ECA	Eastern Coast Guard Area
ETA	Expected Time of Arrival
EW	Early Warning
FSRY	Friendly-Special-Round Robin-Keystone
GFI	Gap Filler Installation
GFR	Gap Filler Radar
HRIOp	Height Range Indicator Operator
HS	Height Supervisor
HT	Height Technician
HUKBPS	Hostile-Unknown-Faker-Big Photo-Pending-Special
IDO	Identification Officer
IFR	Instrument Flight Rules
IND	Intercept Director
INT	Intercept Technician
JJ	Specially Designated Interceptor
K	Faker
LG	Light Gun
LRI	Long Range Radar Installation
MA	Mission Accomplished
MCS	Maintenance Control Section
MDI	Manual Data Inputs
MDS	Manual Data Supervisor
MDSA	Manual Data Supervisor Assistant

MDT	Manual Data Technician
MI	Missed Intercept
MSL	Mapping Supervisor Long Range
NM	Nautical Miles
NORAD	North American Air Defense Command
NYADS	New York Air Defense Sector
(O)	Oral
PV	Picket Vessel
(R)	Radio
RMG	Radar Mapper Gap Filler
RTB	Return to Base
(S)	Switch (followed by switch name)
SASO	Senior Air Surveillance Officer
SAST	Senior Air Surveillance Technician
SC	Senior Controller
SCATER	Security Control of Air Traffic
SD	Senior Director
SDT	Senior Director Techician
SED	Special Expanded Display
SID	Situation Display
SP	Switch Position
SWD	Senior Weapons Director
SWDT	Senior Weapons Director Technician
(T)	Telephone (either dial or button)
TAD	Tactical Action Display

TM	Track Monitor
TMS	Track Monitor Special
TO	Tracking Officer
TS	Tracking Supervisor
TT	Texas Tower
TTG	Time To Go
VFR	Visual Flight Rules
WAD	Weapons Assignment Display
WD	Weapons Director
WDT	Weapons Director Technician

DEFINITIONS

ABORT — to turn back from an aerial mission before completion, for reasons other than enemy action. A switch action taken by Weapons Directors for interceptor tracks which do not reach airborne status.

ACTION — the smallest unit of operation, mental process, manual or communication activity performed by the operator.

AIRBORNE EARLY WARNING — air surveillance provided from long-range aircraft equipped with search radar and communications. Air-surveillance information is relayed to surface stations.

AIR DEFENSE IDENTIFICATION ZONE — an air space above a specified geographical area in which the control and ready classification of airborne objects is required.

AIR MOVEMENTS DATA — flight plan data used in reckoning aircraft movement. The data may be presented in either a situation or digital display.

AIR MOVEMENTS INFORMATION SECTION — a unit of the Federal Aviation Agency which provides flight-plan information to the Identification Branch of a Direction Center. Such information pertains to friendly airborne objects which are, or will be, operating in the organization's area.

ANGELS — the altitude of interceptors in thousands of feet.

AIR ROUTE TRAFFIC CONTROL CENTER — a facility that establishes and monitors routes and altitudes for aircraft flying within a given control area.

AUTO ID — the function whereby the computer identifies aircraft as friendly while within defined flight characteristics.

BIG PHOTO — an aircraft of the Strategic Air Command participating in training missions with North American Air Defense Command.

BOGEY — any potential target aircraft.

BORDER — the call sign for BOADS Direction Center (periodically changed).

BREAKAWAY HEADING — a preplanned heading for an interceptor to roll out on after the intercept has taken place.

BUSTER — maximum cruise speed.

CATEGORY SELECTION SWITCHES — switches for selecting various categories of information to be displayed on the SID (e.g., boundaries, tracks below 15,000 feet).

CLUTTER — unwanted signals, echoes, or images on the face of a cathode-ray tube which interfere with observation of desired signals.

COMBAT AIR PATROL — an air patrol over any area or force usually for the purpose of intercepting and attacking hostile airborne objects before they can reach their objective.

COMBAT MACH — the maximum interceptor speed under combat conditions. Normally synonymous with GATE power setting.

COMMAND ALTITUDE — the altitude that is given an interceptor in a scramble message or any other altitude that is either computer generated or specified by an IND.

COMMAND HEADING — vector or steer calculated by the computer (based upon a computer-generated interception point) to enable interceptors to complete an assigned mission.

CORRELATED MARK X DATA — that Mark X data which is associated with a track.

CORRELATED PRESENT DATA — radar data in the immediately preceding computer frame cycle which is related to an established SAGE track.

CREDIT CARD — a flight by an interceptor to another airbase and return.

CROSSTELL — synonymous with Lateraltell.

CUT OFF — an interceptor vectored on a straight path to the intercept point without regard to attack angle.

DATA LINK — electronic equipment which permits automatic transmission of information in digital form.

DATA TRAIL — quantized representation of radar data on SID including history of previous frames.

DEAD RECKON — a computer action resulting from a manually inserted instruction on a track; this action projects a track for six frames. This is accomplished by logical conclusions based on the assumption of continuity of previously known data. It temporarily prevents a track from being dropped.

ENGAGE — the term used to indicate that air defense artillery weapons have been assigned to, or are actively firing at, a designated target.

EXTRAPOLATE — a computer action occurring automatically or after a manually inserted instruction on Hostile, Unknown, Faker, or Special tracks. Extrapolation projects the track indefinitely by means of logical conclusions based on the assumption of continuity of previously known data.

EYES ONLY OFFICER — the person designated to insure that the proper aircraft are engaged during a system exercise involving live aircraft.

FAKER — classification of a known friendly aircraft simulating an enemy during air defense training missions.

FEATURE SELECTION SWITCHES — two parallel banks of five toggle switches on the upper left corner of a situation-display console; these switches govern display and brilliance of characters in situation-display tabular messages.

FEEDBACK — any signal to an operator (SID attention device, alarm, light, telephone call, etc.) which originates as an immediate result of an action by an operator and informs him of the adequacy of his response.

FLIGHT FOLLOW — consists of observing the behavior of a designated track on the SID and, if possible, establishing radio contact with the aircraft in question and providing the pilot with any information that will assist him in a safe flight.

FRAME — a continuous, repetitive time cycle during which air-defense functions are carried out by a computer.

FRIENDLY — classification of a track based upon established criteria indicating the airborne object to be of one's own or allied forces. It may also be an identification if such action is taken.

GAP FILLER INSTALLATIONS — short-range-radar installations used in areas which are not adequately covered by long-range radar.

GATE — afterburners on; a climb or combat speed power setting.

GEOREF — a special system of coordinates for establishing geographical position on a SID.

HEIGHT REQUEST — a computer or manually generated request to a height-finder site for information relative to height only.

HOBNOB — call sign for Syracuse Combat Center (periodically changed).

HOLD FIRE — a computer action resulting from a manual insertion of a "Hold Fire" order. The result is the transmission of a Hold Fire message to an AADCP to prevent air defense artillery weapons from firing at a specified track.

HOSTILE — classification of a track based upon established criteria indicating the airborne object to be that of an enemy. It may also be an identification if such action is taken.

INDICATOR — any signal to an operator (SID attention device, alarm, light, telephone call, etc.) which originates not as the immediate result of an action by the operator.

INITIATION — the process by which an operator or a computer associates speed and heading with radar or Mark X data to form a track.

ITEM — serial number of each line on TEA sheet, unless continuation of previous line.

JUDY — pilot radio communication that he has a target lock-on on his radar detection equipment.

KEYSTONE — designation for VIP aircraft or any other aircraft of interest to Combat Center or higher echelons.

LANYARD CHECK — an action taken by the pilot so that the parachute release may be activated at low altitudes without time delay, or vice versa, with delay at higher altitudes.

LATERALTELL — communicating air-surveillance information to adjacent SAGE organizations of comparable operational level.

LIGHT GUN — a photoelectric cell in a gun-type case. The gun is used by operators to take specific actions in assisting and directing computer operations.

LONG RANGE RADAR INSTALLATION — a radar installation capable of detecting targets at ranges up to 200 or more miles, providing line of sight exists.

LOST — a track status indicating that insufficient radar data is available to sustain continued correlation. It is also an action which may be computer generated or performed manually.

MACH — the speed of a moving body as measured against the speed of sound at a given altitude. For example: Mach 0.5, a speed equal to one-half the speed of sound.

MAPPING — a manual process wherein a semi-opague paint is used on the face of a mapping console to provide filtered radar data to the computer.

MARK X — a radar system incorporating ground interrogators and airborne transponders which may be used to distinguish friend from foe.

MASKING — a programmed process to eliminate radar coverage beyond boundaries, or to eliminate areas where there is an excess of overlap coverage by radar stations.

MAYDAY — International distress signal.

MODE II — the computer assumes responsibility for part of an adjacent sector when the computer in that sector is inoperative.

MTA BOX — an attention device serving as an alarm for a particular missing track.

MULTIPLE REGISTRATION — the appearance of multiple radar signals from a single target due to simultaneous coverage by different radar stations.

NOPLEX — a special condition of operation at the Combat Center when Direction Center computers are inoperative.

NORAD — a combined command for the air defense of the Continental United States, Canada, Alaska, and the Northeast Area.

OFF COMMAND — the computer uses a ground velocity derived from radar data using a tracking program to track the interceptor (normal tracking).

OFFSET POINT — the point in space (offset from a target's path) toward which an interceptor is vectored and from which the final turn to an attack heading is made.

ON COMMAND — the computer uses ground velocity derived from the intercept direction program to track the interceptor.

OVERLAP RADAR — a long-range-radar located in one Sector whose area of useful radar coverage includes a portion of another Sector.

OVERLAP TELLING — communicating air surveillance information between adjacent manual and SAGE units of the same operational level.

PENDING — a track classification (usually computer assigned) indicating that identification action is required.

POINT FEATURE — the point of origin of the direction vector as displayed on the SID.

PRESENT ALTITUDE — the latest known target altitude (see COMMAND ALTITUDE).

POSS — the possibility of correlating an unidentified target with a flight plan.

RADAR HEIGHT REQUEST — a manually generated request to a specific height-finder site for information relative to height only.

RADAR SPECIAL REQUEST — a manually generated request to a specific height-finder site for information relative to height, flight size, formation and separation of a specified track.

RAPCON GATE — the point at which an aircraft is released to Radar Approach Control of a given base.

RECIP — title of person receiving info as a result of an operator action.

RECOMMIT — designates the actions taken by the WD to make a new mission assignment for an interceptor track. Recommitment may or may not involve an internal handover.

RECOVERY OFFICER — the IND assigned to conduct RTB missions after completion of intercept missions.

REINITIATE -- a manual action by which a track is re-associated with data.

RESPONSE REQUIRED -- an indication of type of action required by operator. May be title of group of actions or name of single action.

REMARKS -- comment on the content of a particular action.

ROOSTER -- colloquial name for data link equipment in interceptor aircraft.

ROUND ROBIN -- a track classification for a nonstop flight of an airborne object or formation which will take off and land at same place.

SCRAMBLE -- an order for interceptors to become airborne as quickly as possible for an air-defense mission.

SECURITY CONTROL OF AIR TRAFFIC (SCATER) -- a plan for use after declaration of an Air Defense Emergency to land or divert all non-tactical military or civilian aircraft currently airborne.

SEMI-AUTOMATIC MODE -- operation of height-finding apparatus primarily controlled and recorded by the computer.

SINGLE MACH -- an indication that the Cruise Mach and Combat Mach are the same value during an intercept mission.

SOURCE -- the person generating info coming to the operator, used only in connection with an indicator not generated by the computer.

SPECIAL -- a track classification for friendly airborne objects on which flight-following reporting and forward tell is specified and requested by the NORAD Combat Operations Center.

SPECIAL REQUEST -- a computer or manually generated request to a height-finder site for information relative to height, flight size, formation, and separation of a specified track.

STANDBY -- switch setting for console power switches, or, any reference to the non-active computer section.

STORE -- the process of inserting information into the computer (used to qualify Response Required).

STRANGER -- any aircraft in the near vicinity of an aircraft under control of an IND.

SUBFRAME — part of a computer frame cycle lasting approximately five seconds.

SYMBOLOGY — the characters or symbols (letters, numerals, pictures, etc.) used to present information on display tubes.

TASK GROUP — a sequence of actions initiated as a result of an indicator. The title of the task group appears in capital letters at the top of the page.

TIME TO GO — time remaining for interceptor to reach offset point or intercept point.

TROUBLE TRACK — any track for which the tracking merit is less than Good for more than one frame.

UNCORRELATED MARK X DATA — that Mark X data which is not associated with a track.

UNCORRELATED PRESENT DATA — the opposite of Correlated Present Data (See Correlated Present Data).

UNKNOWN — a track classification indicating that a track cannot be otherwise classified within a specified period of time.

VECTOR — an instruction to an interceptor to follow a prescribed heading.

WHO — title of position taking an action. If two positions may take the same action, frequency determines precedence for the two titles.